Science Goal Monitor (SGM)
Code 588 / Jenny Geiger

The Information Systems Division

Goals, Objectives, Benefits
What

- Captures scientifically expressed goals and reactions for executing science campaign
- Autonomously processes goals:
  - monitors data from independent sources
  - reacts dynamically when goals are met
- Coordinates responses to data from multiple independent resources
  - e.g. missions, sensors, or theoretical models

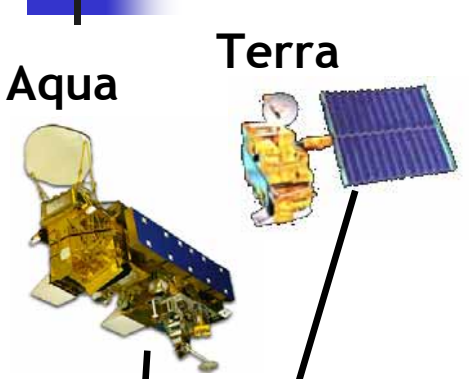
Goals, Objectives, Benefits
Why

- Reduce science data loss and failed observations and increase the ability to perform opportunistic science
- Improves spacecraft autonomy by conducting user specific onboard data analysis
- Improves communication between spacecraft, facilitating coordinated reactions to science events

Approach

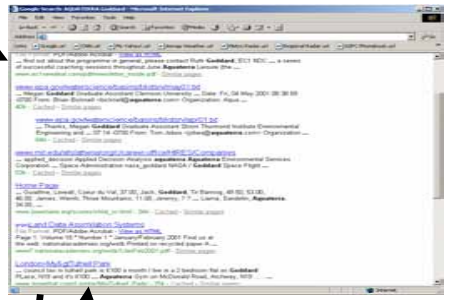
- Core monitor is 100% Java, OS independent
  - currently developing and testing in both Linux and Windows environments
- Development tools all open source or freely available
  - Java; Eclipse; Tomcat; mySql, PostgreSQL, Hsqldb
- "Plug-in" modules let SGM monitor multiple data sources, including POP email text messages, FTP, or other protocols, and provides easier adaptations to new projects

SGM and EO-1



Scientists select area of interest, initiates campaign

SGM Web Monitor



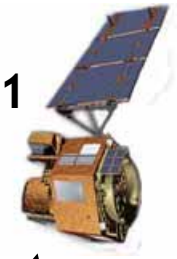


image request

image data

goals, reactions

status, updates and (when ready) link to new image

MODIS data

EOS DAAC / RapidFire System

RapidFire data

SGM

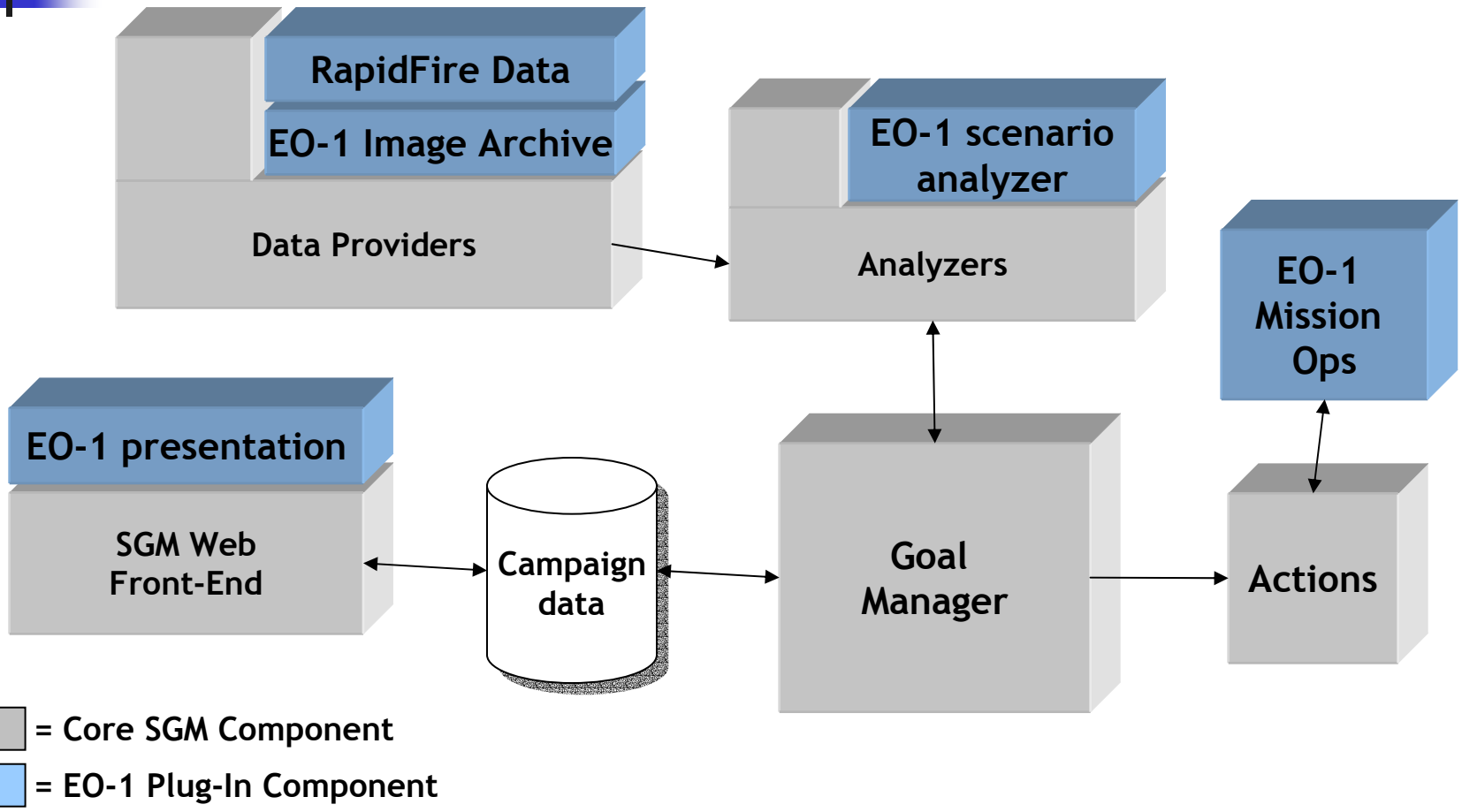
- monitors data for fires in target area
- coordinates with EO1 to initiate image requests
- monitors image status

image requests

status, image data

EO-1 Ops Center

SGM Components



SGM EO-1 Sensor Web Demo - Mozilla Firebird

File Edit View Go Bookmarks Tools Help

http://localhost:8080/sgm/campaignDetails.do?campaign_id=1

SGM EO-1 Sensor Web Demo

Commands

- Edit Campaign
- Delete Campaign
- Home
- New Campaign
- Log Off

Campaign Details

Image the most recent significant fire

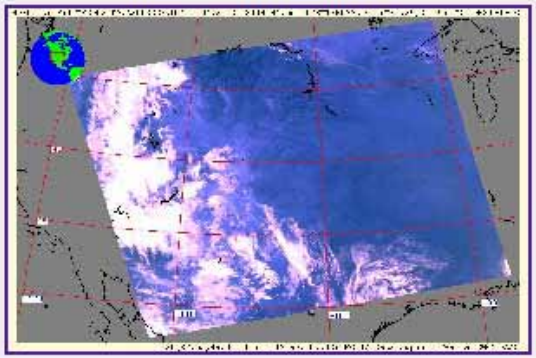
Campaign Details

Campaign Name:	CONUS Fire Demo
Current Status:	LTP Sent
Requested Latitude:	47 38.040 N
Requested Longitude:	113 22.020 W
	View in MapQuest
Target Latitude:	48 33.860 N
Target Longitude:	114 09.816 W
	View in MapQuest
Radius:	200.0 km

Status History

✓ **Created**	2003-08-19 12:50:27
✓ **Start Requested**	2003-08-19 12:52:04
✓ **Started**	2003-08-19 12:52:21
✓ **Sciman Requested**	2003-08-19 12:52:55
✓ **Sciman Received**	2003-08-19 12:53:20
✓ **LTP Sent**	2003-08-19 12:53:21
LTP Confirmed	
Image Taken	
Data Available	
End Requested	
Done	

MODIS Browse Image

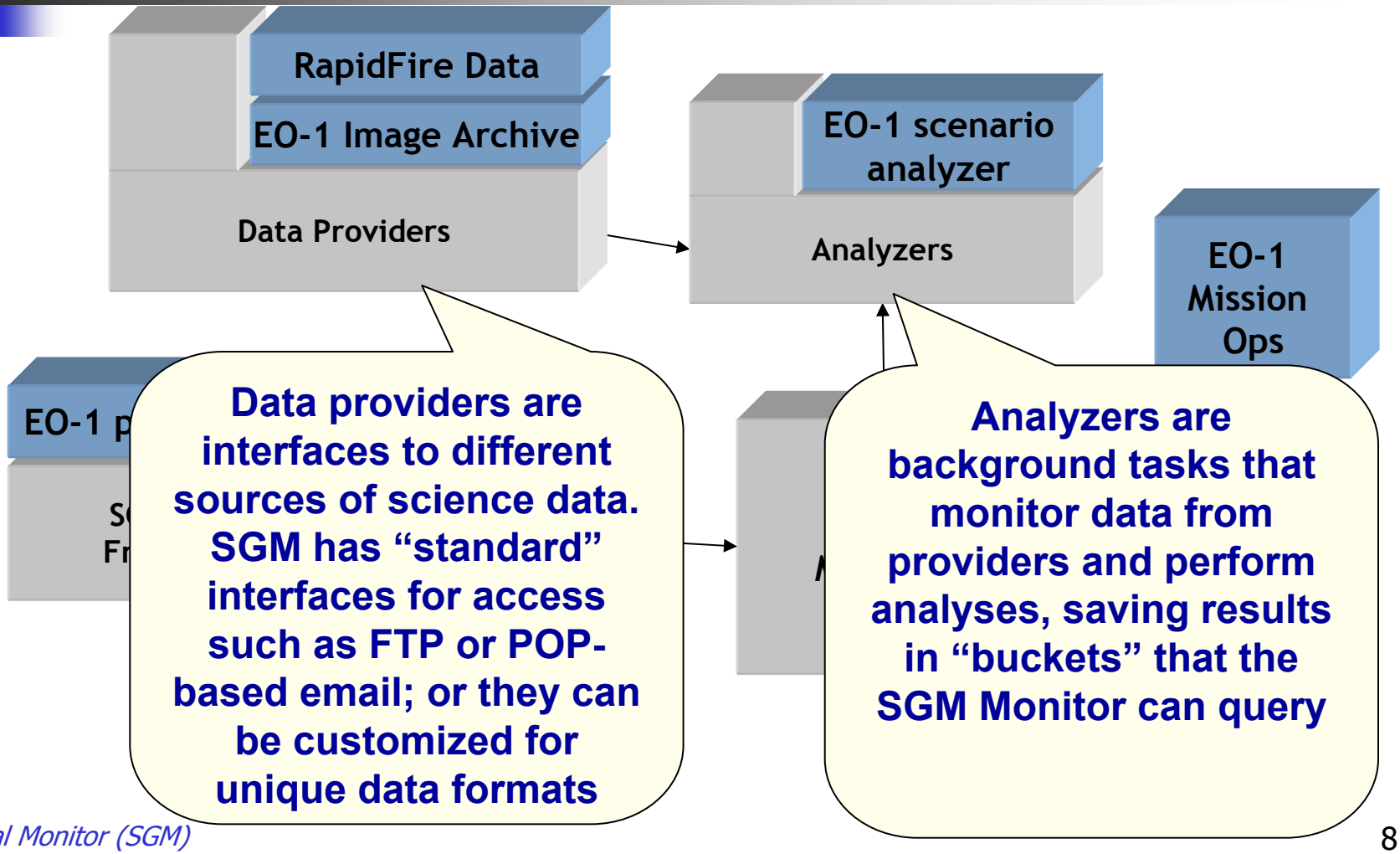


EO-1 Browse Image

No Image Available

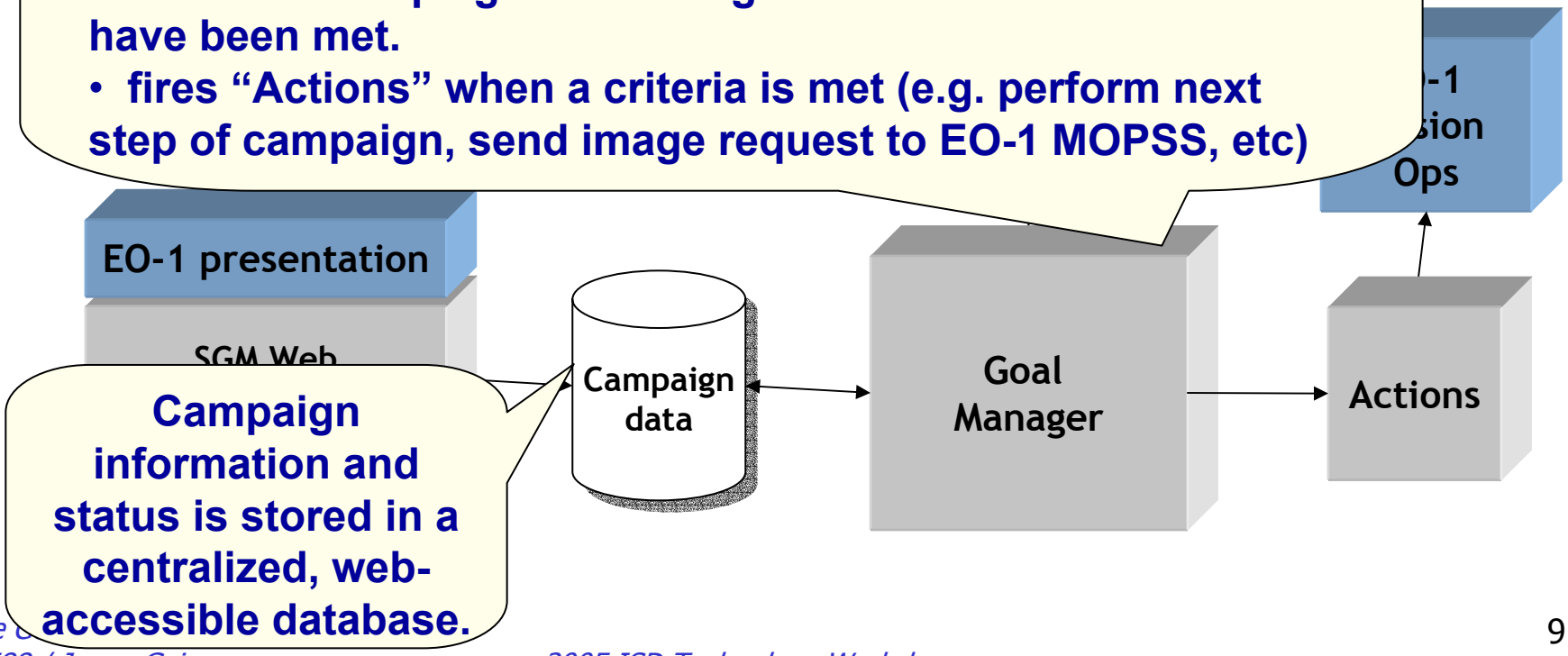
Done

Data Providers/Analyzers



Goal Manager

The Goal Manager manages the progress of a campaign. It:
- **handles requests from campaigns (e.g. starting/stopping data analyzers)**
- **monitors campaign's active "goals" to see if their "criteria" have been met.**
- **fires "Actions" when a criteria is met (e.g. perform next step of campaign, send image request to EO-1 MOPSS, etc)**



SGM and SMARTS

- Small and Moderate Aperture Research Telescope System (SMARTS):
  - 4 telescopes in Chile
  - Consortium of universities and organizations led by Yale
- Goals:
  - improve reaction time to unpredictable astronomical events
  - better understand risk, benefits, and costs to implementing an operational dynamic, autonomous observing schedule
- SGM:
  - monitor alert sources or perform scientific analysis on an image
  - re-schedule rest of night's schedule to handle new priorities
- Status: complete

Next Steps (Collaborations)

- NASA - Rossi X-Ray Timing Explorer (RXTE) Science Operations Facility (SOF)
  - Analysis, Design, Implementation, Demonstration